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FUTURE DEVELOPMENT OF THE ORGANIC SYNTHESIS INDUSTRY

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The organic synthesis industry must fulfill tremendous tasks in the development of such products as synthetic resins and intermediate products for obtaining them, plasticizers, solvents, film-forming materials, and others. The production of these items will have considerable influence on further growth of the plastic composition industry, and on the lac dye, aniline dye, and other branches of the chemical industry.

The following is quoted from the law concerning the current Five-Year Plan:

"To create new branches of organic synthesis on the basis of the processing of coal and by-products of oil refining.

"To ensure the output of a wide assortment of chemical intermediate products for the plastic composition, aniline dye, and lac dye industries. To organize the production of new types of plastic compositions and synthetic resins."

These products of organic synthesis are required by such industries as aircraft, automobile, electrical machinery, and others.

Large quantities of solvents, glycols, synthetic resins, artificial cleansing agents, and other synthetic products are required by the food industry for extraction and soap manufacture, the textile industry for development of synthetic fibers and the improvement of the quality of fabrics, agriculture for organic poisons, and others.

The USSR has an abundance of resources necessary for development of the organic synthesis industry, such as waste gases from processing oil, coal, and natural gases.

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Problems and Plans of Increased Production

The assortment of products of the organic synthesis industry of the USSR at present includes the following: synthetic alcohols, glycols, acetone, dichlorethane, carbon tetrachloride and other solvents, ethyl chloride, vinyl chloride resins and copolymers of vinyl chloride with other components, esters of acrylic and methacrylic acids, perchlorvinyl (perkhlorvinilovaya) resin, phasticizers, and many others.

The production of ethyl, isopropyl, butyl, and allyl alcohols is marked for further increase in the next 3 or 4 years. The production of glycols is being considerably increased, and consequently the production of ethanolamins and celloselves will be developed. The presence of alcohols and glycols will benefit the production of plasticizers.

The further development of the production of acetone resulting from the processing of propylene will soon make it possible to satisfy the growing demands of all branches of industry for this product. It will also serve as a basis for the development of the production of acetic acid, acetates, and acetic anhydride. Along with projected increase in production of acetic acid from acetylene, this will ensure a large supply of acetic acid and acetates, which are especially necessary for development of the plastic composition and lac dye industries.

The production and assortment of synthetic resins will also be increased; in particular, the production of polyvinyl chloride resin, copolymers of vinyl chloride, and organic glass.

The production of pressed powders (presseporoshki) from methylmethacrylate and esters of acrylic acid will be organized on a large scale.

The assortment of solvents will be considerably increased by solvents obtained through the chlorination of methane and acetylene.

The production of synthetic phenol will be increased as the result of a radically improved technological process. By 1950 the total production of synthetic phenol will be several times greater than the figure for 1946.

It is confidently expected that large-scale productio. of the end products of the synthetic fiber (nylon) industry will be attained in the next 2 or 3 years.

The production of chlorine and sodium hydroxide is very important for the development of products of organic synthesis. The production of the latter is marked for increase under the Five-Year Plan.

A considerable part of the production of the organic synthesis industry is devoted to chlorine-organic products (dichlorethane, trichlorethane, methylene chloride and other solvents, polyvinyl chloride resin, and others). In addition, in the course of manufacture, many products of the organic synthesis industry pass through an intermediate stage of interaction with chlorine (ethylene glycol and its derivatives, phosphate plasticizers, synthetic glycerine, and others).

The current Five-Year Plan calls for the use of 45-50 percent of the total output of chlorine by the organic synthesis industry. Therefore, increased production of electrolytic sodium hydroxide is planned for the same period.

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Conspicuous among the chlorine-organic products will be synthetic cleansing agents (detergents) and organic poisons. The output of these products will be greatly increased.

The above-mentioned plans for increasing production will require large investments of capital, both for enlarging present plants and for building new enterprises.

In the current Five-Year Plan up to 75 percent of the total capital investments are being spent on the expansion of presently active plants. The greatest production expansion in the organic synthesis industry is marked for the plants directed by Kaganovich, Khamzin, Matveyev, Aliyev, Uflyand, and others.

The construction of new organic synthesis enterprises will be carried out in Transcaucasia, eastern Siberia, and in other regions, in cooperation with the adjacent branches of industry (primarily near sources of waste and natural gas).

The assistance of the machine-building industry is required. Compressors, gas-separating and high-pressure apparatus, control and measuring instruments, automatic regulating devices, and many other types of machinery are necessary.

Problems and Plans in the Technique of Production

The following authors have won Stalin Prizes for research on production methods: I. K. Zamarayev, S. S. Bobkov, V. T. Zaytsev, P. I. Kuz'minov, Dalin, Markevich, and others.

In their works we have a remarkable example of the high effectiveness of the introduction into industry of catalytic processes (I. K. Zamarayev, S. S. Bobkov, and others), and of the conversion of production from an intermittent to a continuous process (Dalin and others). Both processes were introduced in 1946 and resulted in increased production.

At the scientific-research institute directed by Gavrilov a new method of obtaining vinyl chloride was worked out. The method does not require the consumption of sodium hydroxide and permits the process to proceed continuously. It will serve to increase greatly the production of polyvinyl chloride resin and to make that product considerably cheaper. In one factory, directed by Kaganovich, the introduction of this method resulted in the saving of no less than 6,000-8,000 tons of sodium hydroxide per year.

The law concerning the Five-Year Plan requires the following of workers of the chemical industry: "The development of the chemical industry, based on the introduction of new techniques, continuous methods of production, and automatic control of production, and the realization of the greatest intensification of chemical processes in the nitrogen, sulfuric acid, soda, and aniline dye industries."

At present at the plant directed by Kaganovich, one of the shops is being reconstructed. The periodic method of production in this shop is being converted to the continuous method. The production cycle is being changed, according to the proposal of the experimental plant directed by Dalin. As a result, considerably less raw material will be required; it is expected that production costs will drop, and the number of personnel in the shop will be reduced.

If, instead of reconstructing the shop, a new factory had been built, the expense would have been about 16 times that of the reconstruction, which amounted to several tens of millions of rubles.

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At the plant directed by Khamzin preparations are being made for the reconstruction of one of the shops for the production of organic glass. This will result in increased productivity and an annual saving in expenditure of raw material of more than five times the cost of reconstruction.

Engineers and technicians at the plant directed by Matveyev independently worked out and put into practice a highly-effective continuous method for obtaining hexachlorethane with the use of a catalyst. The method is superior to the periodic one used in the Soviet Union and to the continuous methods of production of this product abroad that are known to us.

At the plant directed by Kaganovich an improvement was introduced in the manufacture of sodium hydroxide. As a result of the intensification of heat exchange in the evaporating apparatus and the application of centrifuges for salt separation, the productivity of the evaporating system was doubled.

In the last 2 or 3 years all chlorine plants have increased the use of electrolyzers 30-50 percent. We now have at our disposal the necessary experimental material for increasing their use 30-40 percent more.

In every plant there are opportunities for improvement, but they are not all utilized. For example, in the plant directed by Kaganovich the work on converting the production of isopropyl alcohol to a continuous process was quite unjustifiably abandoned.

We will not treat here such an important means of increasing production as the automatization of production control. This is an important problem for the workers of the chemical industry.

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